National Aeronautics and Space Administration

Utilizing Opportunities within the Office of Education

NASA Office of Education

- Minority University Research and Education Project (MUREP)
- Experimental Program to Stimulate Competitive Research (EPSCoR)
- National Space Grant College and Fellowship Program (Space Grant)
- STEM Education and Accountability Projects (SEAP)

MUREP

- Ensure that underrepresented and underserved students:
  - Participate in NASA Education Programs
  - Pursue STEM careers, bridge to NASA
- Enhance the capabilities of HBCUs/MSIs
- Community college through graduate school
- Grants, Fellowships, Scholarships
- MUREP Institutional Research Opportunity (MIRO)
  - Enhance and sustain research competitiveness
  - Increase student activity in NASA related fields

EPSCoR

- Facilitate partnerships with academia
  - Discover NASA research alignment
  - Establish research relationships
- Develop institutional research infrastructure
  - Great resource for new faculty
  - Develop competitive research lab capabilities
- Eligibility determined by state: https://www.nasa.gov/offices/education/programs/national/epscor/home/EPSCoR_Directors.html

Space Grant

- 50 States, DC, Puerto Rico
- Scholarships, fellowships, internships
- Enhance STEM Education
- Provide hands on research opportunities
- Partner with Mission Directorates
- Each state has the same goals but may have different implementation

SEAP

- Competitive grants and cooperative agreements, supports NASA center specific and national activities
- Institutional Engagement: Increases STEM capabilities at formal and informal educational institutions and organizations by incorporating content based on NASA's missions.
- NASA Internships, Fellowships and Scholarships (NIFS): Leverage NASA's unique missions and programs to enhance and increase the capability, diversity, and size of the Nation's future STEM workforce.

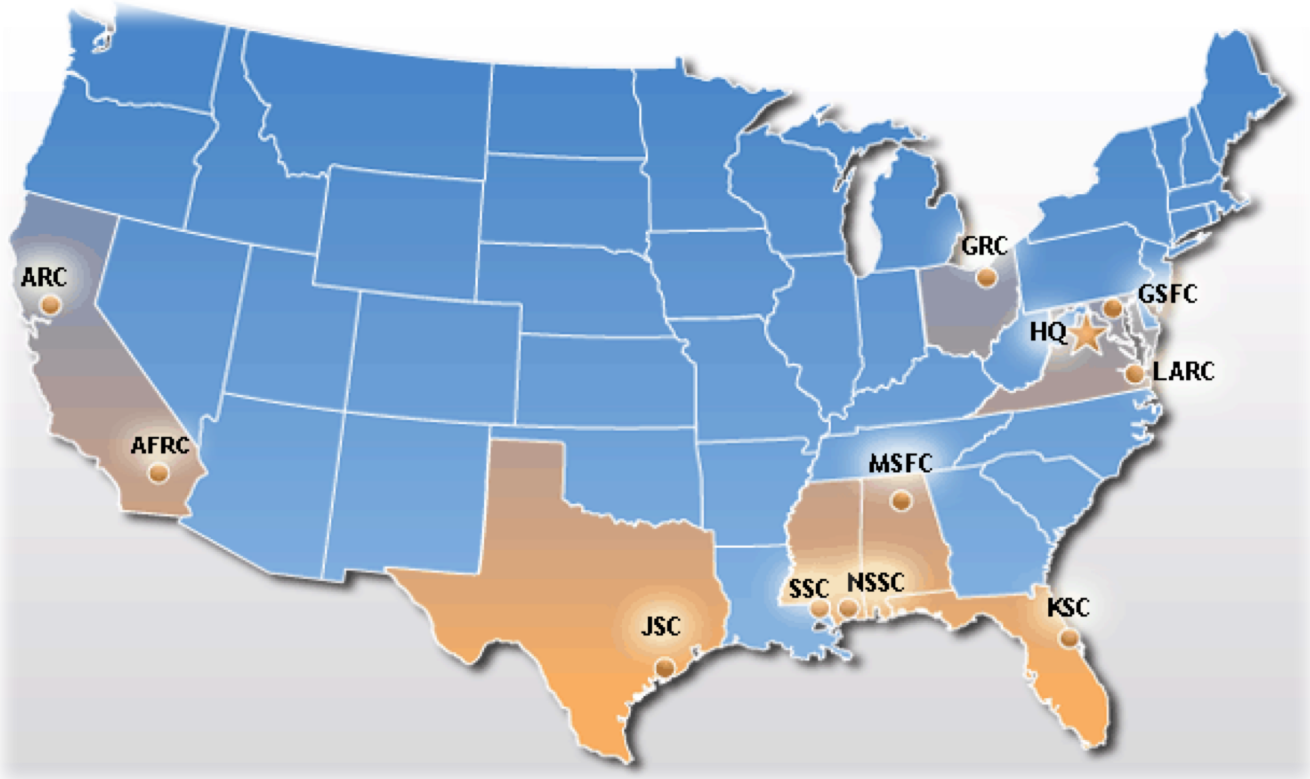
NIFS

- Spring (16 weeks), Summer (10 weeks), and Fall (16 weeks)
- Full time and on-site (40 hours per week)
- Require US Citizenship (Ames and JPL have international student programs)
- HS Seniors through post-docs
- Summer 2017 internships available now, applications close March 1st
- https://intern.nasa.gov/

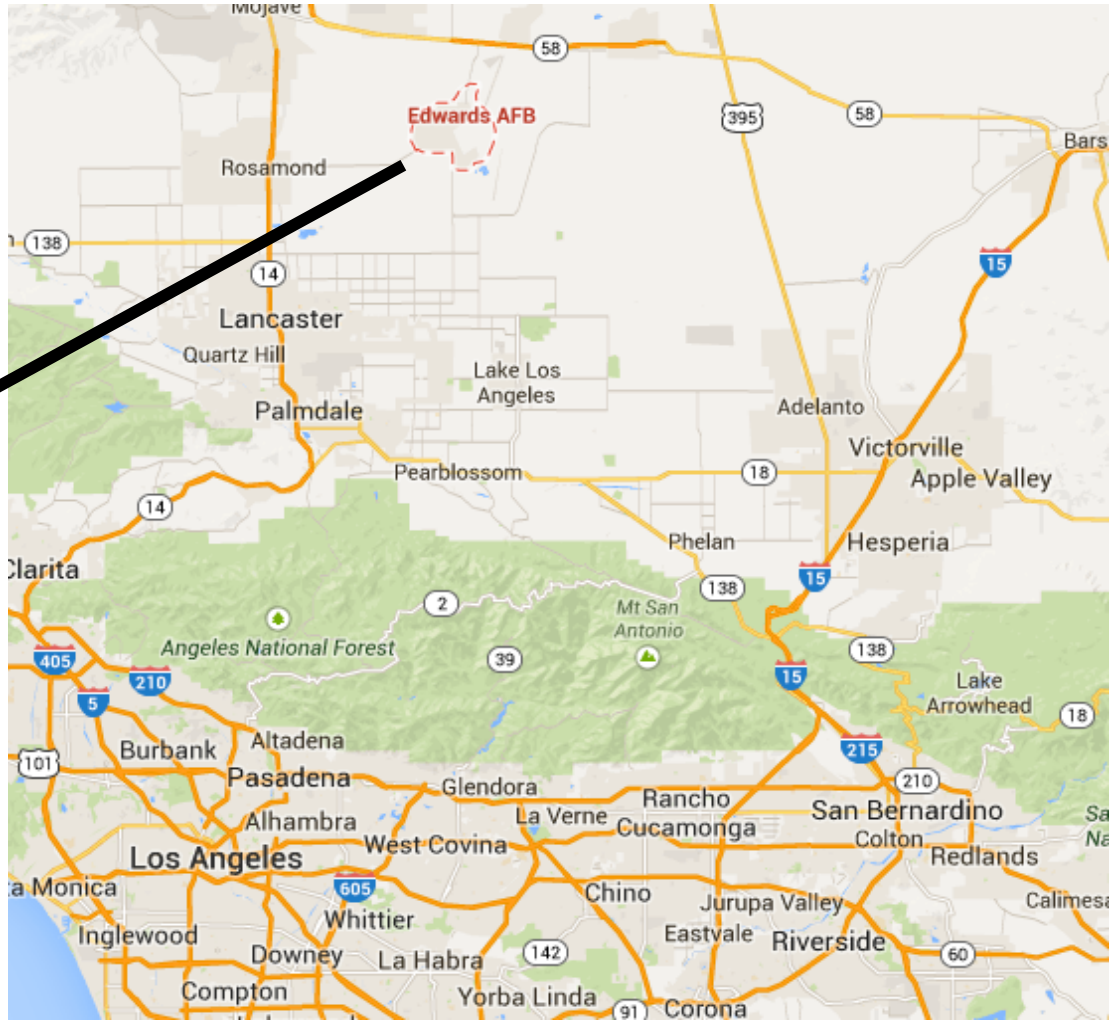
Pathways Internships

- Formerly called “Cooperative Education Program”
- Student Employees
  - Work at NASA when not in school
  - Opportunity to rotate through many different areas
  - Earn benefits and full-time conversion often available
  - Many of the full time work force are former pathways interns
  - Able to convert even when external hiring is not possible
- Opportunities posted at: https://www.usajobs.gov/

NASA Centers



AFRC


Edwards AFB
Rosamond
Lancaster
Quartz Hill
Palmdale
Lake Los Angeles
Pearblossom
Adelanto
Victorville
Apple Valley
Hesperia
Phelan
Clarita
Angeles National Forest
Mt San Antonio
Lake Arrowhead
Burbank
Altadena
Pasadena
Glendora
Alhambra
La Verne
Rancho Cucamonga
San Bernardino
Colton
Redlands
Los Angeles
West Covina
Chino
Jurupa Valley
Eastvale
Riverside
Whittier
Inglewood
Downey
La Habra
Compton
Yorba Linda
Corona

Suggestions on Education Engagement

- If you have an idea that does not fit into existing activities, ask us how we can make it happen
- The large multiyear grants start with small, pre-existing center level relationships
- Partnering on solicitations with experienced institutions is a great way to get started in a new educational activity
- Leverage and integrate multiple Education projects to stretch resources
- Plan for sustainability beyond NASA Education

Suggestions on Education Engagement

- Focus on doing a few things well in solicitation plans
- Evaluation is mandatory and important
- Establish relationships at the center and agency level
- NASA Education can provide points of contact, access to researchers, subject matter expert help, curriculum content and materials, and virtual meetings

Questions?

- Thank you!
- Please contact me with follow up questions, feedback, and partnership discussions
- David Berger
  - dave.e.berger@nasa.gov

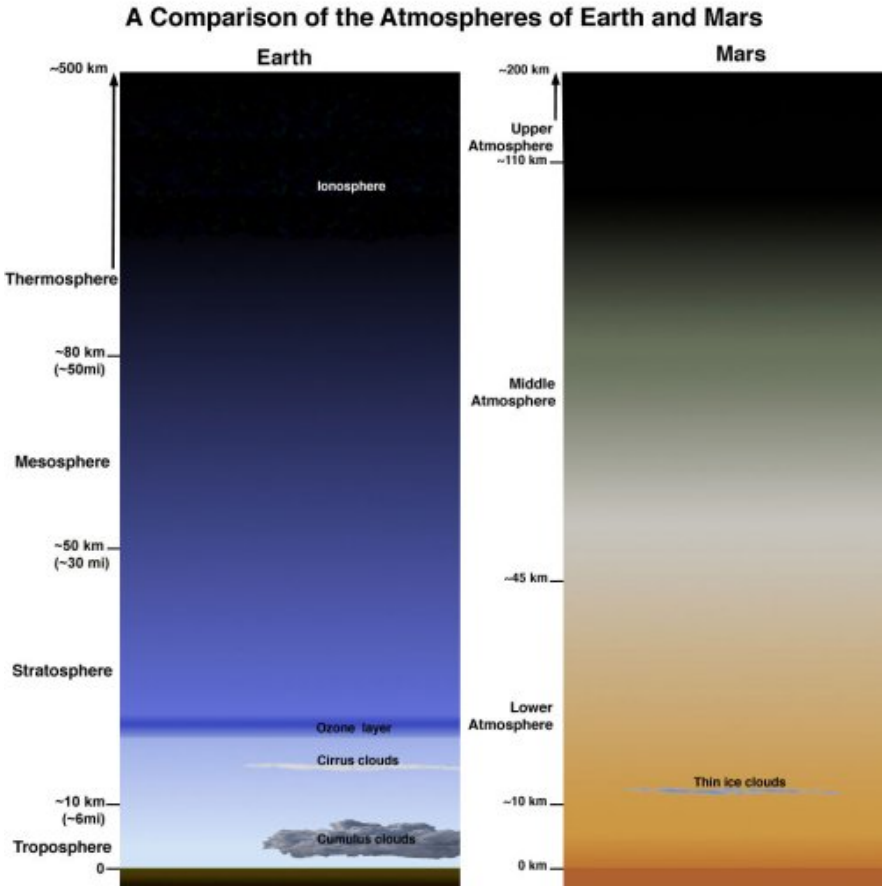
Backup Slides

Prandtl-m Introduction

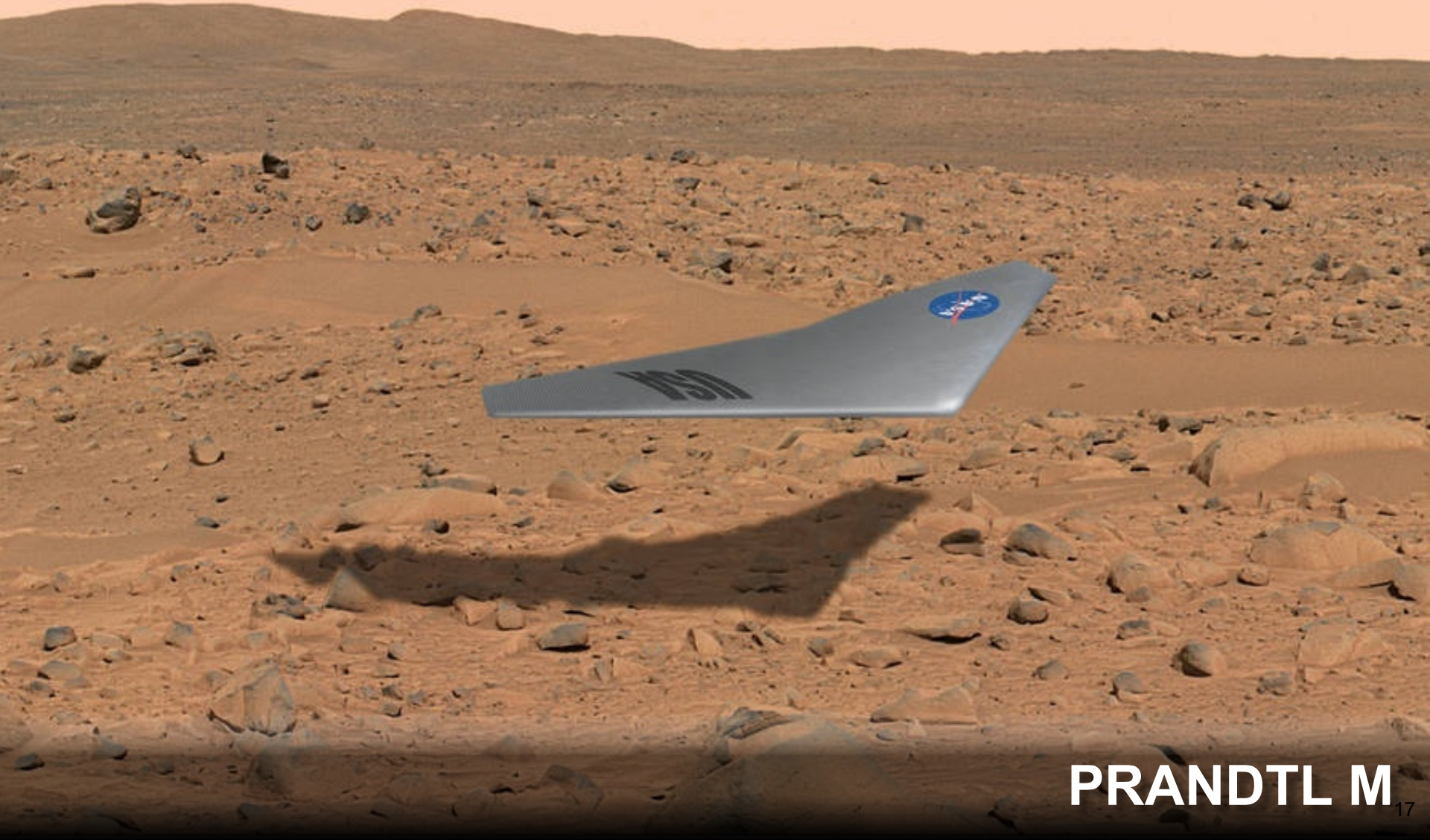
- A Mars aircraft can provide a new science and exploration platform capability
  - Direct atmospheric measurement
  - Higher resolution terrain mapping
  - Faster, longer range coverage than a rover
- Many previous Mars aircraft designs were large “flagship” missions
- Landing missions carry over 50kg of ballast for balance
- What if we replaced part of that with a 3U cubesat containing an airplane?
- What would a minimum viable Mars airplane look like?

Prandtl-m Challenges

- Gravity: ~38% of Earth
- Atmosphere:
  - ~1% Density of Earth at sea level
  - Different chemical composition
  - Very cold <-30 C
- Aerodynamics
  - Very low Reynolds number
  - Moderate subsonic Mach number
- Avionics
  - Cold, low pressure environment
  - Radiation in transit and during flight
- Navigation:
  - No GPS
  - Weak magnetic field
- Size and Weight Constraints

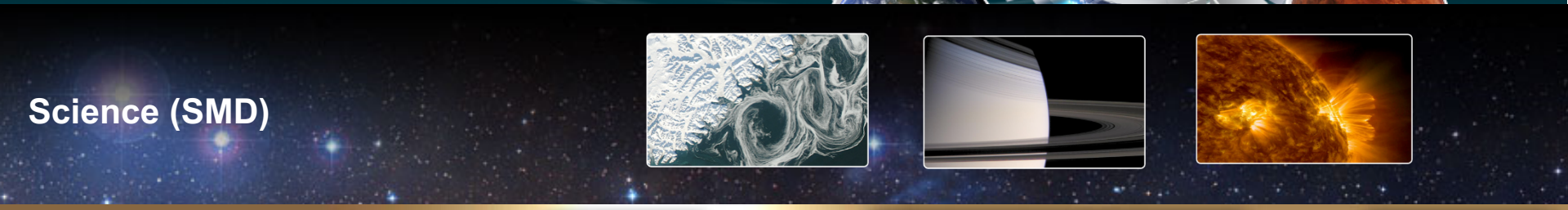


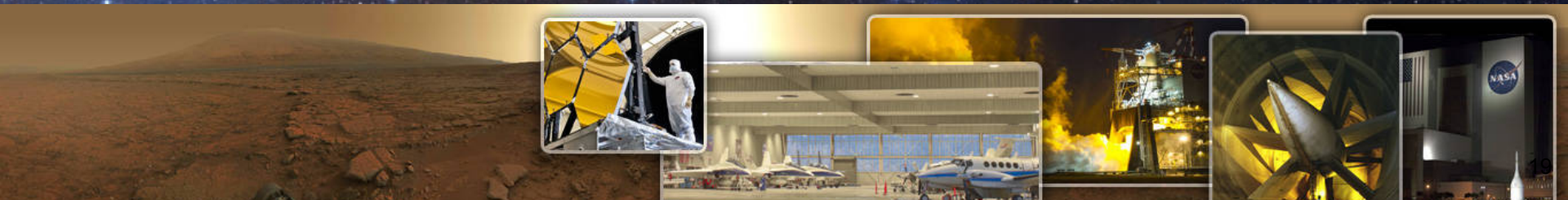
Preliminary Research AerodyNamic Design to Land on Mars (Prandtl-m)



Prandtl-m Team

NASA Mission Directorates





NASA Aeronautics Research Six Strategic Thrusts

1. **Safe, Efficient Growth in Global Operations**
   - Enable full NextGen and develop technologies to substantially reduce aircraft safety risks
2. **Innovation in Commercial Supersonic Aircraft**
   - Achieve a low-boom standard
3. **Ultra-Efficient Commercial Vehicles**
   - Pioneer technologies for big leaps in efficiency and environmental performance
4. **Transition to Low-Carbon Propulsion**
   - Characterize drop-in alternative fuels and pioneer low-carbon propulsion technology
5. **Real-Time System-Wide Safety Assurance**
   - Develop an integrated prototype of a real-time safety monitoring and assurance system
6. **Assured Autonomy for Aviation Transformation**
   - Develop high impact aviation autonomy applications

New Aviation Horizons: Flight Demo Plan

Hybrid Electric Propulsion Demonstrators

Transport Scale

Ground Test Risk Reduction | Preliminary Design | Design & Build | Flight Test

Total Demonstration Cost: $700M

Small Scale "Build, Fly, Learn"

Design & Build | Flight Test | Design & Build | Flight Test

"Purpose-Built" UEST Demonstrators

Life Cycle Cost: $400-500M

Ground Test Risk Reduction | Preliminary Design | Design & Build | Flight Test

Potential Candidates

Life Cycle Cost: $400-500M

Ground Test Risk Reduction | Preliminary Design | Design & Build | Flight Test

Life Cycle Cost: $850M

Preliminary Design | Design & Build | Flight Test

Fully integrated UEST Demonstrator

Life Cycle Cost: $430M

Design & Build | Flight Test

FY17 FY18 FY19 FY20 FY21 FY22 FY23 FY24 FY25 FY26